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ABSTRACT

Intended for use by both elementary and secondary school teachers, this booklet is designed to answer questions instructors might have as they consider integrating microcomputers into their writing programs. Following a brief introductory section, the second section of the booklet reviews the advantages and disadvantages of using computers in the writing class. Disadvantages discussed include lack of teacher and student access to computers, staff resistance, lack of funding, lack of good programs, and the depersonalization of instruction. Advantages discussed include student motivation, the stimulation of ideas, prompt feedback, and the possibility of individualized instruction. The third section examines essentials in preparing both students and teachers to use computers, and the fourth reviews classroom management considerations, such as scheduling. The fifth, and most extensive section, discusses software evaluation, lists sources that provide evaluations, and sets forth evaluation criteria. In addition, this section provides a software evaluation form and uses the form to evaluate a number of programs. The sixth section discusses the uses of word processors and text editors in the writing process, reviewing research that shows the advantages and disadvantages of the word processors in revision. (FL)

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A GUIDE TO

USING THE COMPUTER

IN THE WRITING PROCESS

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WISCONSIN WRITING PROJECT 1983

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WISCONSIN WRITING PROJECT 1983

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The 1983 Wisconsin Writing Project guidebooks are dedicated in the memory of Bob Kellner whose ardent interest in writing served as a motivating force to all people with whom he shared his ideas—both teachers and students alike. He will be remembered, not only for his contributions in the area of language arts, but also for the warm regard he showed to so many people.

Bob Kellner

DPI Language Arts Consultant

1940 - 1983

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I. Instruction

This guidebook was written to assist classroom teachers in using the microcomputer for instruction in written expression. While the computer has traditionally been considered a tool to enhance mathematics and science instruction, we advocate its use as a means to improve the writing of our students. The microcomputer has great potential to assist classroom teachers with many phases of the writing process. The computer can provide drill and practice in specific areas such as spelling, vocabulary development, and usage; it can assist students in editing their work; and it can aid the teacher in managing recordkeeping.

It is important to recognize that the computer like any other tool may enhance a good writing program. However, it must be recognized that, as Shostak (1982) has written:

> We cannot look at computer-assisted instruction as a panacea. Teachers are not going to become good writing instructors simply because they have a unique new technology available to them. They must first understand what it means to be a writer, to experience both the pain and the innovations in instructional technology into an already sound writing program.

It is our suggestion that the computer be integrated into a program of writing instruction which emphasizes the composing process; that is, writing takes place in recursive stages of prewriting, composing, and editing.

There are many questions which the teacher of writing will ask as she considers integrating the computer into a writing program emphasizing

the composing process. The teachers/authors of this guidebook have attempted to demystify the use of computers. This guidebook is divided into the following sections: the advantages and disadvantages of computer use, necessary preparation for the teacher, the management of the computer in the classroom, word processing, criteria for software evaluation, and sources of software for tutorial and whole class instruction.

II. Disadvantages and Advantages

A. Disadvantages of Using Computers in the Writing Process

1. Teacher access to computers

Computer access is of primary importance. Many teachers have either no access or limited access to using computers in their classrooms.

> Scheduling the use of computers is a time consuming and sometimes impossible task. (King, 1982)

2. Student access to computers

The time needed by students using computers will have to be addressed according to grade level, learning styles of the particular group, and the availability of computers.

> As long as they are treated as a scarce resource and as long as you drastically limit the amount of time each child spends at a computer, you are forced to use them in a mechanical way. You can't give everyone a 10-minute go at the computer and expect it to be used as a creative instrument. No one can be creative on a schedule. (Papert, 1982)

3. Staff resistance

There does exist some staff resistance to the use of computers.

> English and language arts teachers may well be the ones most wary of technology. (Fisher, 1983)

This attitude might be based on the misconception that one must understand complicated mathematics to use a computer. Using a computer requires no math skills. Perhaps computers have been equated with calculators as just another tool to teach mathematics when the

possibilities of use in written work are equally limitless.

4. Lack of funding for computers and cost of computers

Perhaps a lack of funding for this type of instructional aid is because the benefits of computer use in the classroom have not been properly addressed by some faculties and administrators. The cost of computers used to be a limiting factor, but prices have come down dramatically. Many teachers have obtained the help of business, school fund raising, and federal funding to purchase microcomputers.

> An example of federal funding of microcomputers is in Dade County, Florida schools which received $300,000 of federal money to purchase microcomputers. (Baker, 1982)

5. Typing skills

Teachers will have to address the problem of poor typing or no typing skills of students, especially below the high school level. Should young children be taught hand positions and letter location on a keyboard? Should these skills be taught only in high school? Teachers will have to come to some concensus on dealing with these issues.

> At the Moreland School in the Shaker Heights School District in Ohio, "all students from grades one through six have the opportunity to learn typing so they can use the computer keyboard; first-graders have two 20 minute typing instruction periods a week. Other students are encouraged to continue the program on their own time at recess periods or after school." (Baker, 1982)

6. Lack of useful programs

Hundreds of small software houses have sprung up that compete for the educational market.

> Software often fails to take account of knowledge about the learning process--of such factors as the learning sequence, the use of relevant cues, and key item-response patterns. (Dean, 1982)

7. Computer language problems

BASIC is the most common programming language in education. A BASIC program written for one computer may not necessarily run on another computer.

> Still missing is a language that is easy to learn and easy to use, one that resembles natural dialogue.... and can be mastered in a few hours. (Dean, 1982)

8. Depersonalization of instruction

> This could occur if a computer is used as a machine based workbook only for drills and if students spend their class time interacting with a machine with little opportunity to listen, speak, or compose meaningful sentence and paragraph patterns. When the computer is used as part of a teacher-guided writing activity in groups, depersonalization is not a problem. (Hennings, 1981)

B. Advantages of Using Computers in the Writing Process

1. Motivates students

One of the most positive aspects of using computers in written composition is that children are highly motivated to use computers. They like to see their spoken language appear on the screen. They are more willing to edit and revise using a computer. Some children feel it is easier than writing with a pencil. This is extremely important for students with poor or handicapped penmanship skills.

2. Improves student written composition

a. Stimulates the generation of ideas

The student chooses a topic and the computer asks a set of questions about the topic. The answers are stored and presented to the student when the student begins writing. (Bradley, 1982)

b. Electronic mail

Students write letters to each other via the computer. Presently, a program is being worked out where students from the University of California at San Diego will exchange messages with children in Alaska. (Kleiman and Humphrey, 1982)

c. Text analysis

These programs assist students and teachers by scanning compositions for structural mistakes. "Writers Workbench" (Bell Laboratories) and "Epistle" (I.B.M.) can analyze writing in terms of spelling, punctuation, diction, grammar, and word use. Some programs which discover only spelling errors can be used with some text editors. (Bradley, 1982)

d. Word processors

Teachers and researchers report positive results when they are used. "The most immediate result is that students want to write more often and produce longer compositions." (Kleiman and Humphrey, 1982)

This topic is discussed more fully in Section VI.

3. Meets the needs of children with different learning styles

Computers appeal to many children but especially to those who are more mechanical in ability. Often this type of individual is poor in writing skills. Using a computer is one way to meet the writing needs of these children.

A severely disabled junior high student "was totally devasted and overwhelmed by the requirements for

written production...that he finally refused to come to school." This situation reversed when he used a microcomputer. He..."could produce an entire page of written expression in one class period where he had previously been unable to produce a paragraph in two class periods using pencil and paper. No longer did he need worry about the physical act of writing..." (Beckerman, 1983)

4. Individualizes instruction

The teacher has the option of using the computer at different levels of instruction according to the specific needs of the children. By using a computer in a variety of ways, the teacher can meet student needs for remediation as well as needs of the gifted. The design of some programs allows a student to proceed at his own pace.

5. Stimulates interaction

Computers can be shared by having children write group stories. This group activity also stimulates interaction of the children. Children can also work in pairs to create and edit text.

A fourth grade class in Oceanside, California, produced a school newsletter, using a computer. They did most of their writing in pairs, helping each other use the computer, and in creating and editing text. (Kleiman and Humphrey, 1982)

6. Provides feedback to students

...computers provide feedback with a truly powerful immediacy. (Southwell, 1982)

Because computers by their very nature are always accurate, patient and impersonal, students are frequently more receptive to a computer's responses than they are to those of their teachers. One student never seemed to be very willing to ask questions in class, but she's eager to have the computer tell her whether her answers are correct. (Southwell, 1982)

Computer-assisted composition instruction is still very new to most teachers of writing. The success of any new innovation in education depends on how well it is accepted by classroom teachers. I think that acceptance will largely depend on three things: 1) how creative we are in solving the problems related to numbers of students and time allotted for writing in the curriculum; 2) how successful teacher educators are in training teachers of writing to approach writing as a process; and 3) how convincing program developers are in demonstrating that computer-assisted instruction, is, indeed, the state of the art in the teaching of writing. (Lawlor, Ed., 1982)

III. Teacher Preparation; Student Preparation

TEACHER PREPARATION

You are still interested in using a computer for some area of instruction in your classroom. You can understand most of the disadvantages yet feel they are outweighed by the advantages. You accept the idea that the computer is not just a passing fad but rather an integral part of the future--at work, at home, and at play. You accept the fact that as educators you and your colleagues will be responsible for graduating people who are computer literate. The problem may now be that you think you are not able to operate a computer yourself much less help others to use one.

This belief is false.

To keep a computer in perspective, you must think of it as just another tool or a piece of audiovisual equipment, as useable as a 16 mm film projector. (Rotier, 1982) You can quickly learn the fundamentals of operating a computer and be able to use it successfully in your classroom. Once you are comfortable with the basic working knowledge, you can then experiment with the more complex levels of graphics and programming if you want to do so. You do not need to know programming to work with the computer and software packages. Any teacher in any classroom can find success in using a computer no matter what level of expertise the teacher has.

Basic Instruction

Basic instruction in a computer can be obtained from a variety of

sources. A first step may be a talk with your principal. She may be able to advise you of possible peer instructors, in-school inservices, formal class instruction available through a local technical school or college, conferences, or even be able to start you in a tutorial program that accompanies your school computer.

Seeking out a fellow teacher for some informal instruction can be one of the fastest ways to learn about a computer. Within a short session of one-on-one guidance you will probably be able to operate a computer and its software. It can be as simple as flipping a switch, pushing in a disk or tape, and learning a few simple rules pertaining to your computer and software use.

School organized inservices can be as rewarding in teaching competence if the timing is right and if there is an appropriate number of computers to be used by the group. The more hands-on experience you have, the more confident you become. Further competence can be acquired through self-teaching using the manuals and possible tutorial software or through enrollment in formal classes.

Software and Hardware

Once you become comfortable in operating a computer and feel you can now work in your classroom with the students, there are two more areas to be investigated. You need to find out what different kinds of hardware your school has and familiarize yourself with the software your school has available.

Hardware is considered to be the equipment that you use. It includes the computer, monitor, printer, disk drive, joysticks, and other items such as these. One of the main concerns in the use of the hareware in the availability of it. Different management techniques are discussed in Section IV.

Software is the disk or tape on which the programs are recorded. Since teachers are not necessarily expected to be writers of their own programs, the software mentioned will be commercial programs. Again you might want to contact your principal to find out what different opportunities for software are open to you. Your school system may already have a library of software or may be a member of an organization that shares or rents programs. You might even be given the responsibility to purchase software. The sections in this guide on software give some suggestions for evaluations and for sources of information on software. When selecting software for use in your classroom you must keep in mind your particular subject area, the age and skill level of the students, and the specific goals you have established.

STUDENT PREPARATION

When you are ready with your computer experience, your carefully chosen software, and your plan for computer use, you have one more area to develop. You need to prepare your students.

For most of the children, with the introduction of the computer to the classroom there comes a level of eagerness, curiousity, and excitement that is easy to direct. The children are very willing to learn how to use

this adult-looking machine. They have few of the fears and inhibitions that are common in many adults.

Basic Instruction

To have children begin using a computer, they need only the basic user instructions mentioned earlier. The main points may be the on and off switch, the correct way to load software, and the other basic rules needed for good care of the computer and its software. Other problems that might need to be address by the teacher at some time are presented in Section IV.

Each program introduced to a class may need further teacher intructions. This need for extra teacher guidance might vary with age and reading levels. Many programs give directions right on the monitor that the user can read and then perform. Programs that tell a user exactly what to do are called "user friendly."

Keyboarding

The likeness of a computer keyboard to that of a typewriter has caused a debate. The question debated is whether young children should be taught how to type with correct form or allowed to "hunt and peck."

Letting children hunt and peck has one advantage; the children are able to go directly to the computer and begin work on a program with little teacher involvement and student pre-learning. This lets the enthusiasm of the child stay at a high level which can be reinforced by a positive response on the computer. A disadvantage of the hunt and peck method is seen in the length of time it takes some children to find the correct key.

This can lead to frustration and impatience on the part of the student and then lead to abandonment of the program. With this in mind, some tutorial programs involve only four or five keys used in direction movement or selection choice and not the whole keyboard.

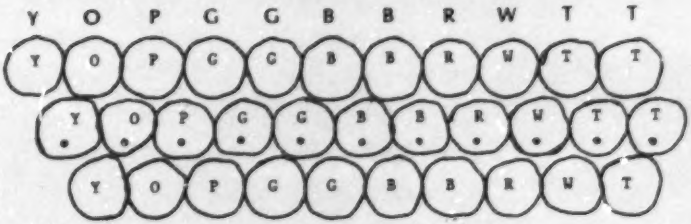
An advantage to prior teaching of correct keyboarding can be noticed when a child reacts to the keyboard in an assured and confident manner. There is no wasted time in trying to find a letter. This does not mean that the typing is done at a high speed but rather in a more exact manner. A disadvantage of this is that the child may become so involved in her fingering that the main objectives of the program are not obtained. It might be beneficial to assess the ability of the child and the requirements of the majority of the software to decide if keyboarding techniques would be helpful to the student.

Included are two diagrams used in teaching keyboarding. They may be helpful when working with a large group when there are not enough typewriters or computers to go around. The use of an overhead by the teacher in conjunction with individual student copies could be productive.

1. Draw a facsimile of a keyboard. Color the keys so that each finger pushes the same color. (There should be eight colors used.) Add a black dot to the home keys. Letter may be added or they may appear on the picture projected by the overhead.
2. Have each child draw two hand prints on construction paper. Draw in the fingernails. Put the upper row letters above the fingers

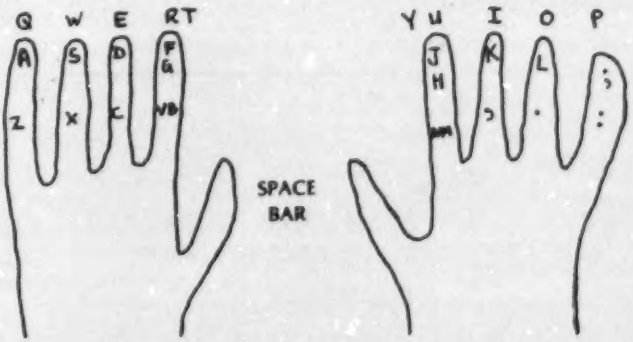
and the lower row letters at the first joint of the fingers.

Again use the overhead to guide a large group.



COLOR/LETTER KEY

Y = yellow	B = blue
O = orange	R = red
P = purple	W = white
G = green	T = tan



IV. Classroom Management

Scheduling

Whether your school has one computer to share among several classrooms or a fully equipped computer lab, there is a way to make valuable use of this tool to aid writing instruction. For the teacher who has access to a computer for a limited amount of time, attention should be given to careful scheduling of its use. Here are some suggestions which could be modified to fit particular needs and goals.

1. Total Class Instruction

Twenty five students viewing one 12" monitor is hardly a workable method, but by hooking up a 21" classroom television monitor or a large portable screen all students are able to see the output from the computer.

2. Timed-Use Relay

After loading software into the computer that meets objectives for a certain activity, individuals or pairs of students are scheduled at the terminal for a specific period of time. To avoid confusion and delay, students know the order in which they go to the computer. The program and a timer are reset by each student as they begin working.

3. Block-Time Format

A 20 to 30 minute time slot can be scheduled for each student in a classroom on a weekly basis.

4. Non-Scheduled Format

Students sign up to use the computer when formal classroom teaching is not in progress. This includes before and after school, study periods, and lunch breaks. Some guidelines could be given to ensure an opportunity for all students to participate. (Phillips, 1983)

In some schools, students are encouraged to take computers and appropriate software home. Management of this out-of-school use can be handled by volunteer parents. Special insurance policies can be written to cover this type of use.

Location and Care

Choice of location for the microcomputer in the classroom can be limited by cabinets, blackboards, and electrical outlets. Positioning the monitor so that it is visible only to those students who are actually using it will help in avoiding distractions.

Chalk dust can be damaging to the hardware and should be avoided as much as possible. Covering the computer overnight with a special anti-static sheet will help to maintain the unit for optimum performance.

Frequent transporting of computers from one location to another should be done using a special cart that will minimize harmful jarring.

Students should be given specific instructions on how to handle the software. Holding the discs by the label only, gently inserting them into the drives, returning discs to their envelopes, and storing them in a central file away from direct sunlight, heat and magnetic materials will help to insure continued usability. It is recommended to obtain a back-up copy

of any widely-used program at the time of purchase.

Ethical Concerns

Maintaining student records within the computer can provide useful information and save time for the teacher, but privacy rights of the individual should be considered. Students should be aware of what information is being stored and be able to challenge data that may be incorrect. (Rushby, 1979)

Piracy, the illegal copying of computer software, is a common practice. School staff should be aware that the copyright law has been revised to include computer programs. Students should be educated so they are not ignorant of the law. (Levin, 1982)

Vandalism and attempts to alter information stored on discs or tapes are also possibilities. Some students may also experiment with obscenities and vulgar language during computer use. Classroom discussions and establishment of basic guidelines could help to prevent these difficulties.

While the above mentioned concerns may be viewed as distinct disadvantages in classrooms using computers, it is worth noting that they also appear in classrooms without computers.

V. Software—Evaluation and Review

With the quantity of software exploding upon the educational scene, the major problem for educators is selecting well-programmed instructional computer software that fits educational needs.

It is essential that teachers be aware of:

1. organizations that describe availability and evaluate software.
2. criteria for their own evaluation.

Regarding number one above, the following resources are available:

A. MECC (Minnesota Educational Computer Consortium)

2520 Broadway Drive
St. Paul, Minnesota 55113
Phone: 612/638-0600

While MECC does not evaluate software, it provides a variety of services to education including: 1) the development and distribution of microcomputer software; 2) inservice training for educators and development of materials for conducting training; 3) instructional computing assistance through newsletters and microcomputer contracts; 4) technical support including timeshare computing, hardware maintenance and local area networking. MECC offers substantially reduced prices on courseware and training products to individual school districts.

B. MICRO SIFT (Micro Computer Software and Information for Teachers)

Northwest Regional Educational Laboratory
300 Southwest Sixth Avenue
Portland, Oregon 97204
Phone: 503/248-6800

The MICRO SIFT service has 27 evaluation sites across the country and each site is manned by at least two teachers and one computer technician. Instructional software is constantly being reviewed and procedures have been established for evaluating packages using as their criteria: 1) instructional quality; 2) areas of content; and 3) technical quality. This information is available by writing the service direct at the above address or through RICE Database described below.

C. RICE (Resources in Computer Education)

Northwest Regional Educational Laboratory
300 Southwest Sixth Avenue
Portland, Oregon 97204

RICE, a data-base, provides information regarding instructional applications of computers in schools. RICE offers both descriptions of software and software evaluation. Each entry on its print-out gives: name of the program, subject matter, mode of instruction, required hardware specifications, instructional objectives and cost. RICE also includes information about commercial and non-commercial producers of computer-based instructional software. If a teacher is interested in researching software in her subject matter, that teacher could write to RICE directly or go through any major IMC which has access to the ERIC computerized resource system.

* * * * * *

As well as being aware of resource availability, it is also necessary that the teacher have a) understanding of the major criteria for evaluation and b) a format for simplifying the individual evaluation process. The

following list of criteria was developed by M. Tim Grady in Computers In Curriculum and Instruction and represents a comprehensive explanation of these various criteria.

Software Evaluation Criteria

Teachers are being asked to evaluate microcomputer instructional software. The following are suggested guidelines for teachers and curriculum staff to use as they work in this area.

Two general parts are present in the evaluation. The first is simply the demographics of the intended use of the programs. The second is the performance criteria or "quality" aspect of the software.

The demographics can be charted on a 5 X 8 card, notebook insert, or similar format. Some instructional planners use a computerized data storage and retrieval scheme for their software. The areas that should be included are:

1. Objective(s)
2. Subject/topic
3. Grade/age level
4. Level of difficulty
5. Prerequisites
   a. Skills
   b. Other software
6. Hardware requirements
   a. Brand name
   b. Memory requirements
   c. Operating system
   d. Peripherals

7. Support materials required

Once the demographics have been written down, cross-referenced across main categories, and placed into a data retrival or card catalog system, teachers will be able to find the programs they need to assist with the objectives their students are working on.

The performance criteria are the true evaluation for the software. Each is presented here as a category or a question. Some teachers will want to translate them into rating scales; others into brief comments. In either case, the user of these criteria will be holding the software up to close scrutiny.

CRITERIA 1: DIRECTIONS. Good software programs are self-directing. The directions should be optional at the user's request and should be available on request for the user. Directions should include worked examples and should take the user through a sample activity.

CRITERIA 2: INSTRUCTIONAL ORGANIZATION. The way to look at instructional organization is to look at the software the same we look at good teaching. In the classroom, we look at how materials are introduced, how appropriate the examples are, use of exercises and formative evaluation, sequencing, correctness of examples and facts, length of a lesson, and flexibility. Good educational software "acts like" good teaching. As teachers we try to be sensitive to our students' needs with regard to alternate examples, reteaching, and review. In computerized courseware, we call that "branching."

Branching should be evaluated. If a bright student is proceeding rapidly through the material, the program should skip ahead to a new section or another objective. If a student is struggling and missing all of the formative evaluation items, then that student's instruction should be switched and some sort of diagnosis performed. As we look at software, we need to evaluate the branching capabilities.

CRITERIA 3: CONSISTENCY. Good instructional software, like good teaching is consistent. The screen layouts should be consistent throughout. The screens should also be uncluttered and self-explanatory. Question format and requests for input should be displayed in a consistent manner. If they are not, we may be putting a student through a screen deciphering exercise instead of a math or science lesson. Keystroke requests should be consistent. If some questions require the student to hit 'return' or 'enter' while other questions require only a single keystroke, students may become confused. Some software will accidentally generate wrong responses if an 'extra' return is encountered while others will stop altogether. Teachers should be sensitive to keyboard inconsistencies and include them in their evaluation.

CRITERIA 4: HELP FUNCTIONS. Who has ever heard of a class where the students can't ask for an explanation or a book where the pages can't be flipped in reverse order? All good software has a built-in help library available for the student when needed. Tutorials should be build in so that the help is not merely a glossary of terms or directions.

CRITERIA 5: ERROR HANDLING. Users of programs will make accidental errors. Some, such as an unneeded return, have potentially disastrous results. Others, such as typo "yes" instead of "y" or visa versa [sic], should be handled by the software. Kids like to put in extra spaces either before or after the words. Good educational software always accommodates extra spaces. When upper and lower case can be treated equally, they should.

Accidental breaks or resets should be trapped and ignored. Unreasonable responses such as "1000" in response to how many spelling words should be tried ought to be trapped and disalloued. Many younger students like to hold keys down for an inordinately long time. This error should be accounted for and the results ignored. Superior courseware protects a program's data during an accidental crash thereby allowing a restart for the students.

CRITERIA 6: REACTIONS TO WRONG STUDENT RESPONSE. When students misunderstand or when they are not following directions, good teachers sense this and alter their teaching strategy. Good computer programs do the same.

These six performance criteria are intended to help teachers and others to critically evaluate educational software. In all cases, the overriding criteria should be: Does this courseware behave according to the behavior of good teaching?

* * * * * *

As well as being aware of the criteria for good evaluation, it is also useful to have a format for teacher evaluation of software that might be purchased or to evaluate software which is already a part of a school's resources. The following format is an example which may serve to simplify the evaluation process.

SOFTWARE EVALUATION FORMAT

PROGRAM NAME: _____ SOURCE: _____ COST: _____

SUBJECT AREA: _____ REVIEWER'S NAME: _____ DATE: _____

1. INSTRUCTIONAL RANGE
   _____ grade level(s)
   _____ _____ ability level(s)
2. INSTRUCTIONAL GROUPING FOR PROGRAM USE
   _____ individual
   _____ small group (size: _____)
   _____ large group (size: _____)
3. EXECUTION TIME
   _____ minutes (estimated) for average use
4. PROGRAM USE(S)
   _____ drill or practice
   _____ tutorial
   _____ simulation
   _____ instructional gaming
   _____ problem solving
   _____ informational
   _____ other (_____)

5. USER ORIENTATION: INSTRUCTOR'S POINT OF VIEW

low high

. . . . . flexibility

. . . . . freedom from need to intervene or assist

6. USER ORIENTATION: STUDENT'S POINT OF VIEW

low high

. . . . . quality of directions (clarity)

. . . . . quality of output (content and tone)

. . . . . quality of screen formatting

. . . . . freedom from need for external information

. . . . . freedom from disruption by system errors

. . . . . simplicity of user input

7. CONTENT

low high

. . . . . instructional focus

. . . . . instructional significance

. . . . . soundness or validity

. . . . . compatibility with other materials used

8. MOTIVATION AND INSTRUCTIONAL STYLE

passive active

. . . . . type of student involvement

low high

. . . . . degree of student control

none poor good

. . . . . use of game format

. . . . . use of still graphics

. . . . . use of animation

. . . . . use of color

. . . . . use of voice input and output

none	poor				good	
.	.	.	.	.	.	use of nonvoice audio
.	.	.	.	.	.	use of light pen
.	.	.	.	.	.	use of ancillary materials
.	.	.	.	.	.	use of _____

9. SOCIAL CHARACTERISTICS

present and negative	not present	present and positive	
_____	_____	_____	competition
_____	_____	_____	cooperation
_____	_____	_____	humanizing of computer
_____	_____	_____	moral issues or value judgements
_____	_____	_____	summary of student performance

RICE SOFTWARE REVIEW

To facilitate the teacher's job as he works tutorially and/or remedially with students in the writing process, the following represents an edited list of software available through RICE from 1966 through July 1983. All of the programs which received negative evaluations have been removed, the abstracts have been capsulized and all programs categorized for easy reference. Included are descriptions of software programs dealing with such things as capitalization, outlining, paragraphing, parts of speech, punctuation, sentence sense, spelling and vocabulary.

Key to Software Entries

1. Program title
2. Hardware
3. Contact information

4. Grade level(s)

5. Cost

6. Summary

Alphabetizing

1. Language Arts: Study Skills
2. Apple II
3. 1100 Research Blvd., St. Louis, MO 63132 314/991-4220
4. Pre-1,2,3,4,5,6,7,8
5. $75
6. Alphabetization skills through fifth letter and beyond. Personalized assignments for entire class. Individualization-optional.

Use of A/An

1. A and An
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 4,5,6,7,8
5. $7.95
6. Enter a or an before nouns within sentences.

Capital Letters

1. Capitals
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 3,4,5,6,7
5. $7.95
6. Reviews rules; provides application by lighting up a word. Students enter whether word is to be capitalized or not.

1. Capitalization
2. Apple II
3. P.O. Box 431, Dimondale, MI 48821 616/942-8987
4. 3,4,5,6,7,8
5. $49.95
6. Reviews rules. Twenty randomly presented sentences. Measures students' abilities to correctly apply rules of capitalization.

Outlining

1. RS-3 Making an Outline
2. PET

3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4,5,6,7,8
5. $7.95, Minnesota residents add 4% sales tax
6. Student given article to read. Then, must finish a partly completed outline by selecting sub-topics within the article. Student may review article. Performance summarized.

Paragraphing

1. Story Starter
2. TRS-80 I, TRS-80 III
3. 2970 Brandywine Rd., Atlanta, GA 30341 800/638-6460
4. 2, 3, 4, 5, 6
5. Mod I & III cassette $24; Mod III 32k disk $24.50
6. Student given topic sentence. Must provide remainder of content. Group options. Follow-up activities included.

Parts of Speech

1. Pronouns
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 4, 5, 6, 7, 8
5. $7.95
6. Sentence presented. Pronoun requested. After third try, student is given pronoun type. Sentences easily changed.

1. I--Basic Sentence Patterns
2. Apple II
3. 1 Dubuque Plaza, Suite 803, Dubuque, IA 52001 800/533-4858
4. 7, 8, 9, 10, 11, 12, Post-secondary
5. $95 (includes backup disk)
6. Identify words and sentences according to parts of speech. Supply words according to their function in given sentences. Sentences easy to change.

1. Parts of Speech
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 5, 6, 7, 8
5. $7.95
6. Student shown sentence. Asked to identify parts of speech. After three errors, answer given.

1. Adjectives
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068

4. 4, 5, 6, 7, 8
5. $7.95
6. Student shown sentence. Student asked to identify adjectives. After three errors, adjectives given. Sentences easy to change.

1. Adverbs
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 4, 5, 6, 7, 8
5. $7.95
6. One word in sentence is illuminated. Is it an adverb? (only one adverb per sentence) Sentences easy to change.

1. The Noun
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95, Minnesota residents add 4% sales tax
6. Contains usage of common/proper nouns. Subject matter first defined and taught through examples. Test at termination.

1. The Adjective
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95, Minnesota residents add 4% sales tax
6. Game format. Student plays against computer to see who gets most points. Performance evaluated at termination.

Phonics

1. Phonat
2. Apple II
3. 1925 W. County Rd. B-2, Roseville, MN 55113 612/638-2348
4. 4, 5, 6, 7,
5. $49.95
6. Phonetic exercises in sound associations. Affixes, syllables, contractions and homonyms also included.

Punctuation

1. Comma
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 3, 4, 5, 6, 7
5. $7.95

6. Word in sentence is illuminated. Should a comma follow that word? One or two commas per sentence. Rules reviewed after error #2. One to four students can play.

1. PU-3 End Punctuation
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8
5. $7.95, Minnesota residents add 4% sales tax
6. .?! Performance summarized.

1. Pu-2 The Apostrophe
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95, Minnesota residents add 4% sales tax
6. Rules presented. Learner tested. Performance summarized.

1. Fundamental Punctuation Practice
2. TRS-80 I, TRS-80 III, Apple II
3. 2970 Brandywine Rd., Atlanta, GA 30341
4. 1, 2, 3, 4, 5, 6, 7, 8
5. Mod I & III Cassette $96; Mod III disk and Apple II $135
6. 50 lessons in skills. Records student performance.

Sentence Sense

1. PU-1 Run-On Sentences
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8
5. $7.95, Minnesota residents add 4% sales tax
6. Groups of words presented. Student divides into two sentences. Performance summarized.

1. No title - Access No. # 2GR-1
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95, Minnesota residents add 4% sales tax
6. Sentences presented with missing words. Word choices stressing singulars and plurals, provided. Game format.

1. US-1 Usage Boners
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292

4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $99 (15 tapes), Minnesota residents add 4% sales tax
6. Common errors in usage presented. Problems randomly sequenced. Performance summarized.

1. GR-1, Agreement of Subject and Verb
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95, Minnesota residents add 4% sales tax
6. Sentences presented with missing words. Word choices, stressing subject verb agreement, provided. Game format.

1. US-2 Misplaced or Dangling Modifiers
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95, Minnesota residents add 4% sales tax
6. Phrase or clause modifying word is dangling or misplaced. Some sentences worded correctly. Student must identify and rewrite. Performance summarized.

1. III-Using Independent Clauses
2. Apple II
3. 1 Dubuque Plaza, Suite 803, Dubuque, IA 52001 800/533-4858 or 319/557-9610
4. 7, 8, 9, 10, 11, 12, Post-secondary
5. $95 (includes backup disk)
6. Student must identify compound elements; distinguish between simple and compound; identify and use coordinating conjunctions. Performance summarized.

Spelling

Teacher Generated Lists

1. SP-1 Guess That Word
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95, Minnesota residents add 4% sales tax
6. Type in words--certain letters omitted. Student supplies letters.

1. Spell and Find
2. PET
3. P.O. Box 150, Commack, NY 11725 516/266-5231

4. 1, 2, 3, 4, 5, 6
5. $20
6. Teacher inputs 20 words. Program selects ten words. Different letters omitted. Student supplies.

1. Look and Spell
2. PET
3. P.O. Box 130, Commack, NY 11725 516/266-5231
4. 1, 2, 3, 4, 5, 6
5. $20
6. Teacher inputs 20 words. Program selects ten words. User looks at word until she has mastered spelling. Child types remembered word.

1. Elementary - Vol. 2 (Language Arts)
2. Apple II
3. 2520 Broadway Dr., Lauderdale, MN 55113 612/638-0627
4. 1, 2, 3, 4, 5, 6
5. $36
6. Teacher generates list. Computer creates mazes, crosswords and mix-ups from list.

Homonyms

1. VO-Homonym Machine
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8
5. $7.95
6. Recognition of homonyms; not correct use.

1. Homonyms
2. Apple II
3. P.O. Box 431, Dimondale, MI 48821 616/942-8987
4. 3, 4, 5, 6, 7, 8
5. $39.95
6. Four lessons at five reading levels. Each lesson contains 20 presentations. Each word used in two different contexts.

1. Grammar Problems for Practice: Homonyms
2. Apple II
3. 1100 Research Blvd., St. Louis, MO 63132 314/991-4220
4. 3, 4, 5, 6, 7, 8, 9
5. $80 module; $375 series (five modules)
6. Tests students' knowledge of homonyms at different levels. Advances to higher level with 90% efficiency.

1. Homonyms in Context
2. TRS-80 I, TRS-80 III, Apple II
3. 2970 Brandywine Rd., Atlanta, GA 30341 800/638-6460
4. 3, 4, 5, 6, 7, 8, 9
5. TRS-80 I & III cassette $39; TRS-80 III disk & Apple II disk $60
6. Six lessons at six levels. Each lesson contains 25 sentences in which student must choose appropriate homonym. Performance evaluated.

Frequently Used-Misspelled Words

1. Spelling - Vol. 1
2. Apple II
3. 2520 Broadway Dr., Lauderdale, MN 55113 612/638-0627
4. 1, 2, 3, 4, 5, 6, 7
5. $34
6. 20 prestored drills in spelling. Student identifies error and chooses from three options for correction. Elementary instructional level.

1. Customized "Flash" Spelling
2. TRS-80 I, TRS-80 III, Apple II
3. 2970 Brandywine Rd., Atlanta, GA 30341 800/638-6460
4. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
5. TRS-80 I, TRS-80 III cassette $24; TRS-80 III disk & Apple II disk $34.50
6. List of frequently used words or teacher generated list. Timed response - goal.

1. Learning Can Be Fun #6
2. TRS-80 I
3. P.O. Box 535, Happy, TX 79042
4. 4, 5, 6, 7, 8
5. $19.95 (five programs)
6. Drill-practice. Commonly misspelled words.

1. Spelling Demons, Computer Spell Down
2. TRS-80 I, TRS-80 III, Apple II
3. 2970 Brandywine Rd., Atlanta, GA 30341 800/241-6402
4. 2, 3, 4, 5, 6, 7, 8, 9
5. Mod I & III cassette $72; Mod III 48K disk & Apple II 48K disk $84
6. 100 most commonly misspelled words. Ten words to ten lessons. Six levels of difficulty.

1. Special Needs - Vol. 1 (Spelling)
2. Apple II
3. 2520 Broadway Dr., Lauderdale, MN 55113 612/638-0627
4. 1, 2, 3, 4, 5, 6
5. $34
6. Used for individual practice. Has been adapted for handicapped.

1. Fundamental Spelling Words in Context
2. TRS-80 I, TRS-80 III, Apple II
3. 2970 Brandywine Rd., Atlanta, GA 30341
4. 1, 2, 3, 4, 5, 6, 7, 8
5. TRS-80 I, TRS-80 III cassette $198; TRS-80 III disk, Apple II disk $225
6. Analysis of common spelling textbook entries. 38 lessons, multi-level difficulty.

Compounds

1. Sp-7 Compound Words
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8
5. $7.95, Minnesota residents add 4% sales tax
6. Student must type two words into compound. Performance summarized.

Rules

1. Doubling Rule or One, One, One
2. Apple II, PET, Commodore 64, Franklin Ace 1000/1200
3. P.O. Box 16322, Minneapolis, MN 55416 612/926-5820
4. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $38 for four tapes PET or Commodore 64
6. Drill-Practice-Tutorial.

1. Extension of the Doubling Rule
2. Apple II, PET, Commodore 64, Franklin Ace 1000/1200
3. P.O. Box 16322, Minneapolis, MN 55416 612/926-5820
4. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $57 for six tapes PET or Commodore 64
6. Drill-Practice-Remediation.

1. Silent E Rule
2. Apple II, PET, Commodore 64, Franklin Ace 1000/1200
3. P.O. Box 16322, Minneapolis, MN 55416 612/926-5820
4. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $47.50 for five tapes PET or Commodore 64
6. Drill-Practice-Tutorial.

1. Sp-6 Level E (Spelling)
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 6
5. $49.95 (seven tapes), Minnesota residents add 4% sales tax
6. Rules and patterns stressed with affix application to root words.

1. Spelltronics: Close Technique Spelling
2. Apple II, PET, TRS-80 I, TRS-80 III, Atari 800
3. P.O. Box 392, Freeport, NY 11520 800/645-3739 (outside New York)
4. 4, 5, 6, 7, 8
5. $59 for three cassettes; $65 for one diskette
6. Linguistic patterns using close procedure stressed. Simple to complex.

1. SP-10 Dropping the Final E
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8
5. $7.95, Minnesota residents add 4% sales tax
6. Ten problems. Performance summarized.

1. F-L-S or Z Rule
2. Apple II, PET, Commodore 64, Franklin Ace 1000/1200
3. P.O. Box 16322, Minneapolis, MN 55416 612/926-5820
4. 3, 4, 5, 6, 7, 8, 9, ,0, 11, 12
5. $38 for four tapes PET, Commodore 64
6. Drill-Practice-Tutorial.

1. The Y Rule
2. Apple, II, PET, Commodore 64, Franklin Ace 1000/1200
3. P.O. Box 16322, Minneapolis, MN 55416 612/926-5820
4. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $47.50 for five tapes PET or Commodore 64

General Spelling

1. Spelling - Vol. 2
2. Apple II
3. 2520 Broadway Dr., Lauderdale, MN 55113 612/638-0627
4. 7, 8, 9, 10, 11, 12, Post-secondary
5. $34
6. Students must enter missing word into sentence. Timed response-objective.

1. Spelling - Vol. 1
2. Apple II
3. 2520 Broadway Dr., Lauderdale, MN 55113 612/638-0627
4. 1, 2, 3, 4, 5, 6
5. $34
6. 20 drills. Teacher generated drill. Questions can be sentence with missing word. Students asked to choose from three word options.

1. Spelling Bee
2. PET

3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Post-secondary
5. $7.95
6. Word flashed on Screen. Teacher sets length of time word is shown. Extensive instruction supplied.

1. Spelling Builder
2. TRS-80 I
3. 11 Idar Court, Greenwich, CT 06830 203/661-8799
4. 8, 9, 10, 11, 12
5. $18.50
6. Drill-Practice.

1. Spelling-Binder and Binder Mechanics
2.
3. P.O. Box 453, Arlington Heights, IL 60006
4. 6, 7, 8
5. $19.95
6. Drill-Practice.

1. Disk Spell-Bound
2. TRS-80
3. 5845 Topp Court, Carmichael, CA 95608
4. 7, 8, 9, 10, 11, 12
5. $24.95
6. Drill-Practice.

1. Spell-Bound
2. TRS-80
3. 5845 Topp Court, Carmichael, CA 95608
4. 7, 8, 9, 10, 11, 12
5. $19.95
6. Computer competes with student. Challenges student to higher and higher levels.

1. Compu-Spell System
2. Apple II
3. P.O. Box 22222, Agoura, CA 91301 213/706-0661
4. 4, 5, 6, 7, 8
5. $29.95
6. Drill-Practice

1. Junior/Senior High Spelling I
2. Apple II, PET
3. 2048 Ford St., Brooklyn, NY 11229 212/646-1040

4. 7, 8, 9
5. $20, cassette
6. Computer selects eight groups of five words. Any of the five may be misspelled. Student asked to find and correct misspelling. Individualized exams.

1. Compu-Spell
2. Apple II
3. P.O. Box 22222, Agoura, CA 91301 213/706-0661
4. 4, 5, 6, 7, 8
5. $29.95, main program disk; $19.95 each of five data diskettes
6. Teaches spelling by projecting correctly spelled words which the student has to replicate.

1. Word Flash
2. Apple II, Apple II Plus
3. P.O. Box 62451, Sunnyvale, CA 94088 408/985-7591
4. 1, 2, 3, 4, 5, 6, 7, 8
5. $12.95 disk
6. Student choice of level. Words flashed on screen. Visual memory emphasis.

<u>Vocabulary</u>

1. Vocabulary Builder 2: IQ Builder
2. PET
3. 11 Idar Court, Greenwich, CT 06830 203/661-8799
4. 9, 10, 11, 12
5. $9.95
6. Drill and practice.

1. Senior High Vocabulary I
2. Apple II, PET
3. 2048 Ford St., Brooklyn, NY 11229 212/646-1040
4. 10, 11, 12
5. $20 cassette
6. 30 words rated for grade level. Computer selects eight at a time and asks student to select definition. If incorrect response, computer gives example of correct use.

1. Junior High Vocabulary I
2. Apple II, PET
3. 2048 Ford St., Brooklyn, NY 11229 212/646-1040
4. 7, 8, 9
5. $20 cassette
6. Computer selects eight words at a time. Asks students to choose definition. Incorrect response activates computer to give example of correct use.

1. Alexander the Great
2. Apple II, TRS-80 I, PET
3. 21 Millbrook Dr., Stony Brook, NY 11790 516/751-5139
4. Pre-1, 1, 2, 3, 4, 5, 6, 7, 8
5. $39.95
6. Game format. Level of difficulty selected by user. Student activity involves selection of definitions.

1. Roots/Affixes
2. Apple II
3. P.O. Box 431, Dimondale, MI 48821 616/942-8987
4. 3, 4, 5, 6, 7, 8
5. $39.95
6. Contains four lessons at five different reading levels. Each lesson contains 20 presentations. Each word used in two contexts.

1. Synonyms
2. PET
3. 1517 Holly St., Berkeley, CA 94703 415/526-8068
4. 4, 5, 6, 7, 8, 9, 10, 11, 12
5. $7.95
6. Computer chooses word out of list of seven similar words. Student must enter a synonym of chosen word. New synonym lists may be entered using accompanying instructions.

1. Anytonyms/Synonyms
2. Apple II
3. P.O. Box 431, Dimondale, MI 48821 616/942-8987
4. 3, 4, 5, 6, 7, 8
5. $39.95
6. Contains four lessons at five different reading levels. Each lesson contains 20 presentations. Each word used in two contexts.

1. VO-2 Vocabulary Series
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 7, 8, 9, 10, 11, 12
5. $168, Minnesota residents add 4% sales tax
6. 72 lessons dealing with words found in newspapers and weekly newsmagazines. Problems present a definition and sample sentence. Student chooses word that fits best.

1. VO-1 Synonym Series
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211

4. 9, 10, 11, 12, Post-secondary
5. $21 (three tapes), Minnesota residents add 4% sales tax
6. 15 lessons dealing with 450 words. Emphasis on vocabulary development and synonym matching.

1. VO-3 Anytonym Machine
2. PET
3. P.O. Box 24156, Minneapolis, MN 55424 612/926-2292 or 926-0211
4. 4, 5, 6, 7, 8
5. $7.95
6. Program contains 50 pairs of antonyms, 20 per session. Student must choose antonym to flashing word performance summary.

VI. Using the Word Processor/Text Editor in the Writing Process

In addition to the numerous drill-and-practice and tutorial software programs available for teaching pre-writing skills, a valuable software package for revision is the word processor/text editor. It uses the keyboard of the computer as a typewriter, but the writer's text appears on the CRT, or monitor, and is stored in the computer. It allows the writer to do many useful things to the text while or after typing. With the knowledge of a dozen or more computer commands, the writer can move into an editing mode to delete unwanted lines of words and add others, change word and paragraph order, and correct spelling, punctuation, and capitalization; with a printer the writer may have a neatly formatted hard copy on which to do further revising at any stage during writing.

One of the major uses of the word processor in the writing process can occur during revision. Three types of revision seem to occur in writing:

1. Incubation and rehearsal, purely mental activities which shape the text as a phase of pre-writing preceding production of hard copy.
2. Continuous rescanning during the composing phase, a way in which writers recapture and reconfirm their sense of direction and alter previous text that doesn't correspond with the newly adjusted sense of direction.

3. Revision after a draft of a piece of writing is completed, what teachers typically think of when they consider revision. (Collier, 1981)

Many teachers feel that revision is one of the most important parts of the composing process but admit that students don't do much of it. One reason students don't revise is that it's hard work. It is difficult enough to apply all the presentational amenities to their work, reorder sentences and paragraphs, insert more information, and delete unwanted parts, but then the task of recopying with the added opportunity to make new errors awaits them. It is no wonder many students don't like to revise.

With the word processor/text editor, revision is much easier. In fact, revision can be fun. Students can make major and minor changes without having to recopy, and they can immediately read a clean, revised text. This DOES NOT insure the revisions will be of better quality. Revising strategies of students are essentially the same on the word processor as when composing in the traditional mode, except they do more of what they normally do and increase the number of substitutions at the word and phrase/clause level. (Collier, 1981) Research suggests that students who don't receive much instruction on the revising process don't revise much. (Cromwell, Hawes, 1981)

To enhance instruction in the revising process, computer-managed tutorials on sentence combining or paragraph organization might be used.

These have been mentioned in Section V. Only by helping students internalize strategies for presenting logical arguments and structures for a variety of sentences and paragraph types can we free up short-term memory space for combining and generating new ideas, the deep-structure of writing. (Daiute, 1983)

A study involving inexperienced writers who revised on word processors instead of by hand revealed many positive outcomes:

1. The number and complexity of operations employed for revision increased. Students made two-thirds more substitutions, twice as many reorderings, and two-thirds fewer deletions.
2. Words, phrases and clauses were moved more often.
3. There was an outstanding increase in substitutions, one word for another and one T-unit for another.
4. Length of texts increased slightly.
5. The subject engaged in more revisions. They experimented with many alternatives.
6. Use of the word processor was a distinct advantage for the superior student and of moderate value for the average student.
7. Most students reacted favorably to the opportunity to use the word processor despite its complexity and the frustration they felt in learning to use it. The clarity of their words on the screen facilitated a more realistic assessment of their writing and more productive revision.

However, results from the same study support the traditional handwritten mode of revision, or, at least, fail to support use of the word processor.

1. Students did not make serious and elaborate additions to their work with the word processor. In fact, more substantial revisions were made by hand, i.e., at the idea cluster and paragraph level.
2. Inexperienced writers carried forward more surface structure errors when using the word processor. They also created more errors in second drafts and corrected fewer errors.
3. Comparison of groups in which original drafts were typed into the computer for the student versus groups where students typed in their own original work showed no significant improvement in revision strategies.
4. Use of the text editor was least successful for subjects whose writing skills were weakest.
5. Motor, mechanical and mnemonic abilities are needed to master the text editor's terminal.
6. Even though there was an increase in writers' efficiency and experimentation, the use of the word processor didn't enhance the quality of their written products. (Collier, 1983)

The previous study asked students to do most of their revising alone in front of the computer. In another study, students were asked to revise on hard copies of their printed texts, enter changes in the

computer, receive new printed text, and revise them again until they were satisfied. Students interviewed expressed their increased willingness to change their ideas at the paragraph level because changes could be more readily incorporated into the finished piece. (Bean, 1983)

A study particularly concerned with the revision process allowed students to type into the computer their pre-written assignments. Then the teacher brought into consciousness, through discussion, the revisions that were made even during the first typing. During the next session students gathered around the terminal and participated in peer editing. They helped each other find spelling and other mechanics errors which were easily entered into the computer. Each student was given a printout of his paper.

The next assignment asked students to expand the paper by writing at least one additional paragraph. Students were shown how to insert their paragraphs as well as other features of the word processor.

For a semester students were given weekly in-class writing assignments. They revised their drafts by conferring in groups. Many students used the computer room before school and during free periods to do additional revision. The teacher observed that students made more revisions and made them at a higher level when using the word processor instead of paper and pencil. This teacher's concern with the revision process certainly contributed to the quality of the revised products. (Monahan, 1982)

The three studies mentioned point to several options teachers have when using the word processor in the writing process. There are many others. In the kindergarten classroom or wherever students do not have keyboarding skills, teachers or parents may type in the students' writing.

Primary teachers and students may use the word processor in the creation, recording, and editing of an experience story. After the initial pre-writing stage where ideas are talked-out, students begin to draft their ideas into sentences which can be entered into the computer and displayed on a large classroom monitor. Students may make suggestions about the order of the sentences or other editorial changes until they are satisfied with their product. The teacher then commands the computer to make printouts for all the students in the writing group to be placed in a personalized booklet of compositions they can read and reread. (Hennings, 1981)

At upper elementary or junior high school grades, teacher-guided group writing and editing might follow a similar procedure. A group of students who have been pursuing a research study might gather with the teacher to compose several paragraphs to summarize their findings. In the pre-writing phase, they would talk about what they had uncovered, perhaps identifying the major points they want to make. The teacher or student who has learned to command the computer inputs suggested sentences which are displayed on the monitor.

Cooperatively, group members now go back and edit their text. Changes

are readily displayed on the monitor. When students feel pleased with the revisions, the printer can produce hard copies for each student in the group. These copies may be further edited and each student may make a personal copy of her revisions by entering them into the computer. (Hennings, 1981)

It can be seen from the two previous examples that subtle changes in the writing process occur when we ask students to compose orally. The composing process of dictation, like that of writing includes three recursive stages: planning, dictating, and revising/editing/correcting. (Halpern, 1982) But the magic of actually applying words to the page stimulates and generates new ideas and new combinations of ideas. If teachers are to be successful in teacher-guided group writing, they must build in recursion to the oral composition.

In pre-writing, or the planning stage, students can be encouraged to note their ideas and plan their central idea. A wheel with their focus in the center and supporting details drawn out from the center as spokes is a useful idea.

During dictation, it is important that students be given ample time for planning with frequent pauses and rereadings of what has been written already. The teacher/word processor must emphasize the ease with which words can be changed, rearranged or erased entirely. If this type of classroom atmosphere is developed, dictation can be truly recursive.

Finally, research indicates some writers cannot evaluate their work

critically unless they recopy it. (Daiute, 1983) This again points to the magic of the writing act. Encourage students to rewrite their final drafts, at least some of the time, and make final revisions as they see fit. Writing is more than a vehicle for recording our thoughts, but a way to discover and clarify our thinking. Teachers must not be too quick to take up the stylus (computer) for their students.

We have suggested a number of ways computers may be used in the writing process. There are many more possibilities—some that haven't been thought of yet. The microcomputer and the word processor/text editor are valuable tools to enhance the teaching of the writing process. As man shapes his tools, he will ultimately be shaped by them. The writing process and the ways we teach it may change as a result of this powerful, new technology. Teachers of English cannot and should not be left out of this technological revolution. We need to show how we can use this powerful equipment to enhance our teaching. However, it will be important not to let our fascination with this new technology overshadow our current knowledge of how to teach writing with concern for all phases of the writing process.

VIII. Conclusion

Finally, I always like to remind people that it is not clear that the computer is going to improve education. The computer, like any new technology, has the potential for improving education or weakening education. Everything in human technology has this dual potential. When humans first learned to use fire, they found that fire could be used for good or for bad. The technology itself doesn't determine whether it is going to be good or bad. People do. And we have to remember that the computer is a gift of fire. (Lawlor, 1982)

VIII. Reference List

Baker, Justine. Microcomputers in the Classroom. Bloomington, IN: Phi Delta Kappa Educational Foundation, 1982.

Bean, John C. "Computerized Word-Processing as an Aid to Revision." College Composition and Communication. Volume 34, Number 2 (May 1983) 149-155.

Beckerman, Judith. "You Don't Have to Know the Language." The Computing Teacher. (February 1983) 23-25.

Bradley, Virginia. "Improving Students' Writing with Microcomputers." Language Arts. Volume 59, Number 7 (October 1982) 732-742.

Collier, Richard M. "The Influence of Computer-Based Text Editors on the Revision Strategies of Inexperienced Writers." Paper presented at the Annual Meeting of the Pacific Northwest Conference on English in the Two-Year College, Calgary, Canada, October 1981. (ERIC Document Reproduction Service No. ED211998.)

Collier, Richard M. "The Word Processor and Revision Strategies." College Composition and Communication. Volume 34, Number 2 (May 1983) 149-155.

Cronnell, Bruce; Humes, Ann. "Using Microcomputers for Composition Instruction." Washington, DC: National Institute of Education, 1981. (ERIC Document Reproduction Service No. ED203872.)

Daiute, Colette A. "The Computer as Stylus and Audience." College Composition and Communication. Volume 34, Number 2 (May 1983) 134-145.

Dean, Jay W. "What's Holding Up the Show?" Today's Education-Elementary Edition. (April-May 1982) 21-23.

Fisher, Glenn. "Word Processing-Will It Make All Kids Love to Write?" Instructor. (February 1983) 87-88.

Grady, M. Tim and Gawronski, Jane, eds. Computers in Curriculum and Instruction. Alexandria, VA: Association for Supervision and Curriculum Development, 1983.

Halpern, Jeanne W. "Effects of Dictation/Word Processing Systems on Teaching Writing." Paper presented at the Annual Meeting of the Conference on College Composition and Communication, 33rd, San Francisco, CA,

March, 1982. (ERIC Document Reproduction Service No. ED215357.)

Beck, William P., Johnson, Jerry and Kansky, Robert J., preparers. Guidelines for Evaluating Computerized Instructional Materials. Washington, DC: National Council of Teachers of Mathematics, 1981.

Hennings, Dorothy. "Input: Enter the Word Processing Computer." Language Arts. Volume 58, Number 1 (January 1981) 18-22.

King, Joan. "Computers for All." Today's Education-Elementary Edition. (April-May 1982) 25-26.

Kleiman, Glen and Humphrey, Mary. "Word Processing in the Classroom." Compute. (March 1982) 22, 96-99.

Lawlor, Joseph, ed. Computers in Composition Instruction. Los Alamitas, CA: Southwest Regional Laboratory for Educational Research and Development, 1982.

Levin, Barbara B. "Computer Software and the Copyright Law." Wisconsin Computer Summerfest, School of Education, University of Wisconsin-Madison. (June 1982) 41.

Minnesota Educational Computing Consortium (MECC). MECC Educational Computing Catalog. St. Paul, MN: MECC, 1983.

Monahan, Brian D. "Computing and Revising." Electronic Media. Volume 71, Number 7 (November 1982)

Papert, Seymour. "Computers Are Objects to Think With." Instructor and Teacher. (March 1982) 86-89.

Phillips, Wayne R. "How to Manage Effectively with Twenty-Five Students and One Computer." The Computing Teacher. Volume 10, Number 7 (March 1983) 32.

Rottier, Jerry. "Reducing Computer Tension." Instructional Innovator. Volume 27, Number 3 (March 1982) 28.

Rushby, Nicholas J. Computers in the Teaching Process. New York: Halsted Press, 1979.

Shorstak, Robert. "Computer Assisted Composition Instruction: The State of the Art." Lawlor, ed. Computers in Composition Instruction.

Southwell, Michael. "Computers and Developmental Writing." The Computing Teacher. (November 1982) 34-35.

Users: MECC Instruction Computing Newsletter. Volume 9, Number 5 (May 1983).

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